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ABSTRACT

This study tested several hypotheses about the effects of the cognitive style of students on their ability to learn a subliminal task while viewing a non-related film. Subjects were 132 undergraduate students who were divided into three groups: field dependent, neutral, and field independent. The task to be taught subliminally was the assembly in order of the pieces of a tangram (seven geometric figures which, when correctly assembled, form a square). Two versions of a videotape were produced for the study, one with subliminal messages and one without. Analysis of the data showed that neither the main effects nor the interaction between cognitive style and treatment were significant, and students in this study were not able to be taught a task subliminally no matter what cognitive style. These findings are in accordance both with DeChenne's earlier and similar study, and with later studies in other areas. However, it is suggested that in this particular study, the task may have been too difficult and the amount of subliminal stimulus too small. In addition, consideration should be given to the effect of using a subliminal task that would be related to the content of the film presentation to support the subliminal stimulus. The text is supplemented by two tables and a figure depicting the slides used to produce the subliminal message on the videotape. (8 references) (EW)

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# Cognitive Style and Subliminal Instruction

a
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by

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The inclusion of subliminal messages within the educational films or videotape might be a useful but controversial technique. Subliminal perception is defined as a visual stimulus which occurs below the level of conscious awareness and could effect an individual's behavior. Moore (1982) suggested that possible uses of subliminal messages in instruction might include: directing student attention, reiterating certain concepts, promoting affective goals or supplanting perceptions of visual elements or actually teaching unrelated concepts. Amid the controversy in the late fifties over subliminal perception used in advertising, numerous research studies have failed to indicate consistent results.

In some earlier studies which used television or film, it was attempted to teach one idea or task while viewing an unrelated program. These approaches did not prove successful, as students did not perform better from subliminal instruction unrelated to the content in the program (DeChenne, 1976; and Taris, 1970). Moore and Moore (1984) however, found a significant difference in recall between field independents and field dependents when viewing subliminal television captions which supplemented visible captions and thus, may be an effective device for improving achievement attributable to cognitive style. This potential of subliminal activity to improve instruction as shown in the Moore and Moore (1984) study suggests a possible interaction between cognitive style and subliminal information. This result gave rise to the possibility of the current study -- testing if cogntive style (individual differences of field dependence-independence) would interact with a subliminal task taught within a film (videotape) of unrelated context. To test this possibility a partial replication of the earlier study by DeChenne (1975) was conducted.

Ausburn and Ausburn (1978) urged continued study into the relationship between properties of media and the characteristics of individual learners. Witkin and his associates have conducted most of the research and have provided much of the information concerning the cognitive style of field dependence and field independence. Much of their work is summarized in the Review of Educational Research, Witkin, et al. (1977). People classified as field independent tend to be able to give structure to unstructured material and can separate parts from its whole. Field dependents need structure and tend to view objects and scenes in their entirety. Compared to field independents, field dependents have a greater need for and are more dependent on external sources of structure and organization. Information recall from visuals for field dependents is facilitated if major cues are irrelevant or not noticeable. Field independents tend to be able to take information from both irrelevant and relevant cues. Field dependents tend not to add structure to visuals and accept visuals as presented (Witkin et al., 1977).

Differences in learning may result from an interaction between cognitive style (field dependent, field independent) and the teaching subliminally a task unrelated film or tape being shown. It appears that the ability to perceive subliminal messages varies and cognitive style could be a factor. Moore (1982) states:

> How people perceive a televised image that contains a subliminal message may be partially determined or influenced by the process they use to analyze and decode the visual field... and as such may be related to cognitive style (p. 27).

Because field independents are more capable of consciously discerning parts of a visual scene and field dependents have more difficulty with a similar task it is hypothesized that field

independents would be able to discern subliminal messages better than field dependents. Although, subliminal messages are not consciously perceived. The repeated nature of the presentation (14 times) and the formal structure of organizing the information (i.e., the seven parts of the puzzle presented in the same order) might increase the importance of context cues and make them more relevant for the field dependent person. Thus field dependents who were shown the subliminal treatment might in fact do better in completing the task than those field dependents who were not given the subliminal message. The purpose of this study was then to test these hypotheses of students' ability to learn a subliminal task while viewing a non-related film.

DeChenne (1976) attempted to teach problem-solving psychomotor skill by subliminally showing the pieces of a puzzle being assembled. On a videotape, the seven consecutive steps for assembling the puzzle were repeatedly superimposed on a university public relations film. Elementary, high school and college age students comprised the sample groups. Following the tape, the participants took a timed test to assemble the puzzle. Only a few participants in any group were able to assemble the puzzle correctly, but there was a tendency for the subliminal treatment groups to assemble correctly the puzzle more frequently than the associated control groups. This tendency was not statistically reliable. However, no measures of individual differences were taken into account. In this study using an older audience of all college students, the above study was partially replicated using cognitive style (field independence, field dependence) as the independent variable to test the hypothesis of the interaction of cognitive style and subliminal instruction.

Subjects

The subjects for this experiment were 132 undergraduate college students (92 female, 40 male) enrolled in professional education courses. These subjects were classified as field dependent, neutral or as field independent by means of the Group Embedded Figures Test (GEFT) (Consulting Psychologists Press, 1977). Because the test manual sets no guidelines for grouping, the subjects were arbitrarily assigned into the above categories in approximately thirds based upon their scores (0-18). Subjects with scores of 15 and higher were classified as field independent (N = 47), those subjects with scores ranging from 11-14 as neutrals (N = 45) and those with scores of 10 and under were classified as field dependent (N = 40).

Procedures

The task chosen by DeChenne (1976) to be taught subliminally was the assembly in order the pieces of a tangram. A tangram consists of seven geometric figures when correctly assembled, for a square. The seven parts of the tangram are illustrated in Figure 1.

For the production of the slides, the seven geometric parts of a tangram were cut out of posterboard. The seven geometric figures were assembled and photocopied on a copy stand to form a square. As each figure was placed on the copy stand, a slide was taken. The completed slide series consisted of the seven slides also illustrated in Figure 1.

The following criteria were used in selecting the film used in this experiment.

1. The film was approximately 15 minutes in length.

2. The content of the film did not contain academic subject matter.

3. The content of the film was not related to the task taught subliminally.

A promotional film was entitled "Tech Territory" produced by the Informational Services Film Unit at Virginia Tech was selected.

Two video tapes were produced for use in this study. One video tape contained subliminal the stimuli and the other contained no subliminal stimuli. For the production of the video tape containing subliminal stimuli, the 2 inch by 2 inch slides showing the step-by-step procedures involved in assembling the seven geometric figures of a tangram into a square were presented by a Schneider Synchro-Compur shutter with a setting of 1/200 of a second. A video tape recorder recorded the simultaneous projection of the film through the film chain and the superimpostion of the projected slides.

The slides were presented at five second intervals until the entire slide series had been presented. The entire slide series was presented 14 times during the showing of the video tape.

For the production of the video tape containing no subliminal stimuli, the film was projected through the film chain and recorded by a video tape recorder. The subjects viewed either the film with the subliminal stimuli or the film without the stimuli by random selection. They viewed the presentation on the same 25 inch television monitor in groups of eight or less. At the completion of the video tape, each subject was given an envelope containing the seven pieces of a tangram and given 10 minutes to assemble the pieces into a square. Upon time being called the number of pieces assembled correctly was noted. The total presentation was approximately 25 minutes including instruction and time to assemble the tangram.

The dependent variable used in this study was to be the number of pieces, zero to seven, assembled correctly. Only pieces assembled in the manner described by the subliminal slides were to be counted. The independent variable was field-dependence, neutral or field independence.

## Results

A two way analysis of variance was the statistical design used in this study. The summary table of the analysis of variance based upon the means in Table 1 is presented in Table 2. The F ratio dealing with field dependency ($F(2,126) = .70$, $p = .5007$) was not significant. Neither was the F ratio dealing with treatment (subliminal or non-subliminal) ($F(1,126) = .02$, $p = .8822$) nor was the F ratio dealing with interaction between dependency and treatment ($F(2,126) = .74$, $p = .4804$). As shown in the Table of Means, the mean scores for all groups were quite small considering the possible 0-7 as the criterion score. None of the main effects nor the interaction between cognitive style and treatment were significant.

## Discussion

In an effort to see if cognitive style and the attempt to teach a task non-related to a videotaped presentation, it is clear that the attempt do not work. The results were similar to what DeChenne (1976) originally reported, subjects in this study were not able to be taught a task subliminally no matter what cognitive style. These findings are also in accordance with

Taris (1970) who was unable to teach a science concept subliminally. Skinner (1969), however, was able to increase vocabularies of ninth graders via a subliminal approach. DeChenne (1976) in his original study suggested that the size of screen, the resolution of the color video tape and the placement of the subliminal stimuli over moving objects on the screen may have limited the subjects' ability to perceive the stimuli. Moore (1982) in reviewing DeChenne's experiment also suggested that if the subliminal treatment had stressed the final, assembled pattern rather than arbitrarily defined sequence of placement, there might have been a larger number of correctly assembled parts.* This author, however, feels that there are other possibilities. First, the task may have been too difficult and the amount of subliminal and the amount of subliminal stimulus too small. In setting up the design of the study it had been decided to use a subliminal tasks unrelated to the content of the film presentation. The subliminal instruction was to stand alone and not reinforced by the film's content to avoid a confounding factor of sources of information. However, because of this fact that subjects were concentrating on the content of the video tape itself may have caused the communication channels to become overloaded and/or confused. This, of course, had assumed that a subliminal approach would or could teach a concept. It is obvious at least in this experiment and in that of the earlier DeChenne experiment, non-related subliminal instructional task within a film (videotape) was not taught no matter what cognitive style. Although in this experiment the means were higher (not significantly) for the subliminal treatment for both field independents and field dependents. This was also true in DeChenne's earlier experiment. The mean of criterion scores 0-7 indicated the average was just above 1.0, which indicates that an individual subjects were able to get only a small part of the puzzle correct. It was hypothesized that field independent individuals would by their nature, be able recognize and thus disembed consciously or unconsciously the subliminal stimuli and to use that information to assemble the puzzle than field dependents. The field dependents which had the subliminal treatment did not do significantly better than those not receiving the subliminal treatment as hypothesized. However, there may be a possibility that subjects could be taught this skill of if alerted to the fact of subliminal presence and the task at hand.

*Note: In this study both the order of pieces and the final pattern were reviewed with no difference in the final result.

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Table 1

Correct Answer Means by Cognitive Style and Treatment

| | N | Mean | Overall Dependency |
|---|---|---|---|
| Field Independent | 47 | | 1.54 |
| Non-subliminal | 28 | 1.29 | |
| Subliminal | 19 | 1.79 | |
| Neutral | 45 | | 1.14 |
| Non-subliminal | 22 | 1.36 | |
| Subliminal | 23 | 0.91 | |
| Field Dependent | 40 | | 1.05 |
| Non-subliminal | 19 | 1.00 | |
| Subliminal | 21 | 1.09 | |

Table 2

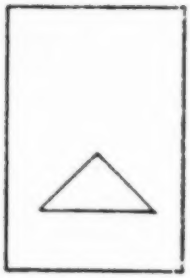
Analysis of Variance

| | df | ss | MS | F |
|---|---|---|---|---|
| Field Dependency | 2 | 4.875 | | 0.70 |
| Treatment | 1 | 0.077 | | 0.02 |
| Dependency x Treatment | 2 | 5.169 | | 0.74 |
| Model | 5 | 10.120 | 2.024 | |
| Error | 126 | 441.599 | 3.505 | |
| Total | 131 | 451.720 | | |

*p > .05

**p > .01

***p > .001



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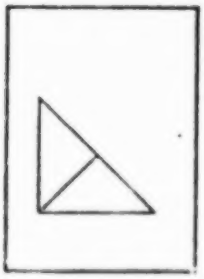

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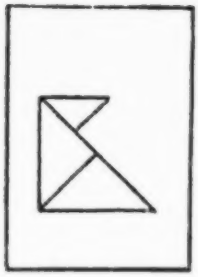

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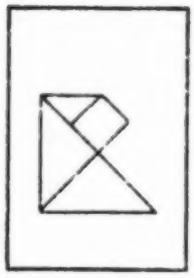

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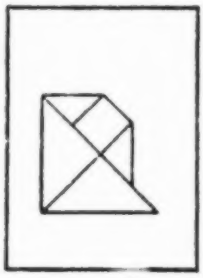

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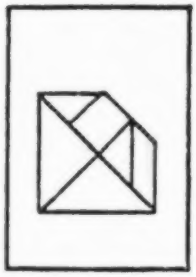

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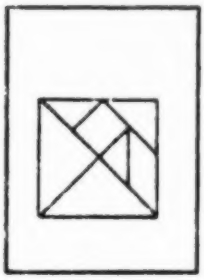

SLIDE NO. 7